

IN THE CLAIMS

1. (currently amended) A method of oxidizing an oxidizable substrate which comprises bringing an oxidizable substrate into contact with ~~Use of~~ at least one metal complex of formula (1)



wherein

Me is manganese; titanium; iron; cobalt; nickel or copper,

X is a coordinating or bridging radical,

n and m are each independently of the other an integer having a value of from 1 to 8,

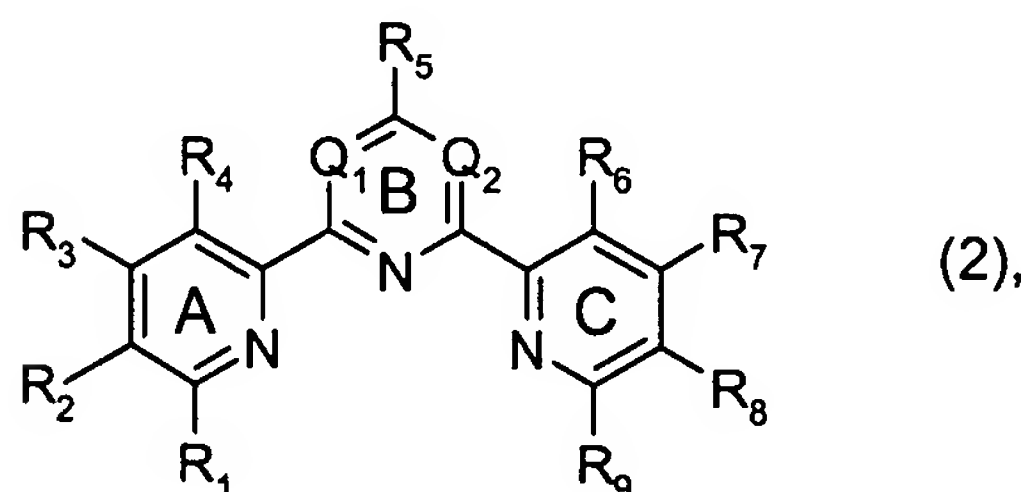
p is an integer having a value of from 0 to 32,

z is the charge of the metal complex,

Y is a counter-ion,

q = z/(charge of Y), and

L is a ligand of formula (2)



wherein

Q₁ is N or CR₁₀,

Q₂ is N or CR₁₁,

R₁, R₂, R₃, R₄, R₅, R₆, R₇, R₈, R₉, R₁₀ and R₁₁ are each independently of the others hydrogen;

unsubstituted or substituted C₁-C₁₈alkyl or unsubstituted or substituted aryl; cyano; halogen; nitro; -

COOR₁₂ or -SO₃R₁₂ wherein

R₁₂ is in each case hydrogen, a cation or unsubstituted or substituted C₁-C₁₈alkyl or unsubstituted or substituted aryl;

-SR₁₃; -SO₂R₁₃ or -OR₁₃ wherein

R₁₃ is in each case hydrogen or unsubstituted or substituted C₁-C₁₈alkyl or unsubstituted or substituted aryl;

-NR₁₄R₁₅; -(C₁-C₆alkylene)-NR₁₄R₁₅; -N[⊕]R₁₄R₁₅R₁₆; -(C₁-C₆alkylene)-N[⊕]R₁₄R₁₅R₁₆;
 -N(R₁₃)-(C₁-C₆alkylene)-NR₁₄R₁₅; -N[(C₁-C₆alkylene)-NR₁₄R₁₅]₂;
 -N(R₁₃)-(C₁-C₆alkylene)-N[⊕]R₁₄R₁₅R₁₆; -N[(C₁-C₆alkylene)-N[⊕]R₁₄R₁₅R₁₆]₂; -N(R₁₃)-N-R₁₄R₁₅ or
 -N(R₁₃)-N[⊕]R₁₄R₁₅R₁₆, wherein

R₁₃ is as defined above and

R₁₄, R₁₅ and R₁₆ are each independently of the other(s) hydrogen or unsubstituted or substituted C₁-C₁₈alkyl or unsubstituted or substituted aryl, or

R₁₄ and R₁₅, together with the nitrogen atom linking them, form an unsubstituted or substituted 5-, 6- or 7-membered ring which may contain further hetero atoms,
 as catalysts for oxidation reactions with organic peroxy acids and/or precursors of organic peroxy acids and H₂O₂ and or a precursor of H₂O₂.

2. (currently amended) A method~~Use~~ according to claim 1, wherein Me is manganese, which is in oxidation state II, III, IV or V.

3. (currently amended) A method~~Use~~ according to ~~either~~ claim 1 ~~or claim 2~~, wherein X is CH₃CN, H₂O, F⁻, Cl⁻, Br⁻, HOO⁻, O₂²⁻, O²⁻, R₁₇COO⁻, R₁₇O⁻, LMeO⁻ or LMeOO⁻, wherein R₁₇ is hydrogen or unsubstituted or substituted C₁-C₁₈alkyl or aryl, and L and Me are as defined in claim 1.

4. (currently amended) A method~~Use~~ according to ~~any one of claim~~ ~~[[s]] 1 to 3~~, wherein Y is R₁₇COO⁻, ClO₄⁻, BF₄⁻, PF₆⁻, R₁₇SO₃⁻, R₁₇SO₄⁻, SO₄²⁻, NO₃⁻, F⁻, Cl⁻, Br⁻ or I⁻, wherein R₁₇ is hydrogen or unsubstituted or substituted C₁-C₁₈alkyl or aryl.

5. (currently amended) A method~~Use~~ according to ~~any one of claim~~ ~~[[s]] 1 to 4~~, wherein n is an integer having a value of from 1 to 4, ~~especially 1 or 2~~.

6. (currently amended) A method~~Use~~ according to ~~any one of claim~~ ~~[[s]] 1 to 5~~, wherein m is an integer having a value of 1 or 2, ~~especially 1~~.

7. (currently amended) A method~~Use~~ according to ~~any one of claim~~ ~~[[s]] 1 to 6~~, wherein p is an integer having a value of from 0 to 4, ~~especially 2~~.

8. (currently amended) A method~~Use~~ according to ~~any one of claim~~ ~~[[s]] 1 to 7~~, wherein

z is an integer having a value of from 8- to 8+.

9. (currently amended) A method ~~Use~~ according to claim 1 ~~to 8~~, wherein

R₅ is C₁-C₁₂alkyl; phenyl unsubstituted or substituted by C₁-C₄alkyl, C₁-C₄alkoxy, halogen, cyano, nitro, carboxy, sulfo, hydroxy, amino, N-mono- or N,N-di-C₁-C₄alkylamino unsubstituted or substituted by hydroxy in the alkyl moiety, N-phenylamino, N-naphthylamino, phenyl, phenoxy or by naphthyloxy; cyano; halogen; nitro; -COOR₁₂ or -SO₃R₁₂

wherein R₁₂ is in each case hydrogen, a cation, C₁-C₁₂alkyl, unsubstituted phenyl or phenyl substituted as indicated above; -SR₁₃, -SO₂R₁₃ or -OR₁₃

wherein R₁₃ is in each case hydrogen, C₁-C₁₂alkyl, unsubstituted phenyl or phenyl substituted as indicated above;

-N(R₁₃)-NR₁₄R₁₅

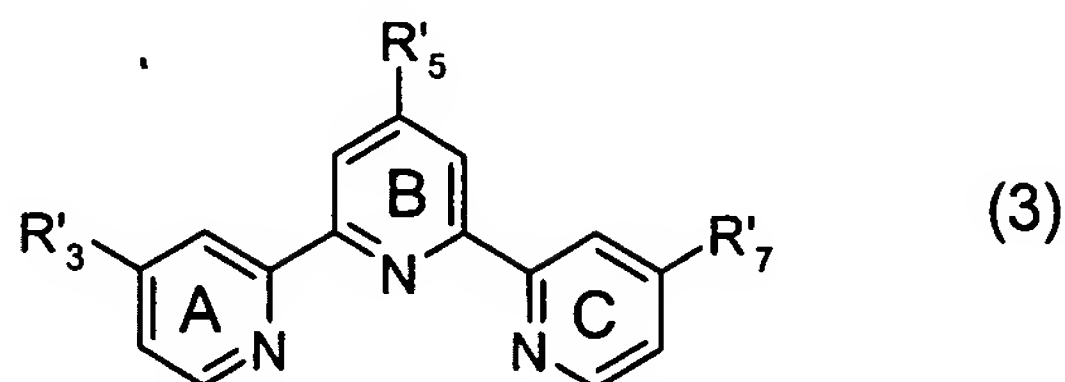
wherein R₁₃ is as defined above and R₁₄ and R₁₅ are each independently of the other hydrogen, unsubstituted or hydroxy-substituted C₁-C₁₂alkyl, unsubstituted phenyl or phenyl substituted as indicated above,

or R₁₄ and R₁₅, together with the nitrogen atom linking them, form an unsubstituted or C₁-C₄alkyl-substituted pyrrolidine, piperidine, piperazine, morpholine or azepane ring;

-NR₁₄R₁₅ or -N[⊕]R₁₄R₁₅R₁₆ wherein R₁₄, R₁₅ and R₁₆ are each independently of the other(s) hydrogen, unsubstituted or hydroxy-substituted C₁-C₁₂alkyl, unsubstituted phenyl or phenyl substituted as indicated above,

or R₁₄ and R₁₅, together with the nitrogen atom linking them, form an unsubstituted or C₁-C₄alkyl-substituted pyrrolidine, piperidine, piperazine, morpholine or azepane ring; N-mono- or N,N-di-C₁-C₄alkyl-N[⊕]R₁₄R₁₅R₁₆ unsubstituted or substituted by hydroxy in the alkyl moiety, wherein R₁₄, R₁₅ and R₁₆ are each independently of the others hydrogen, unsubstituted or hydroxy-substituted C₁-C₁₂alkyl, unsubstituted phenyl or phenyl substituted as indicated above, or R₁₄ and R₁₅, together with the nitrogen atom linking them, form a pyrrolidine, piperidine, piperazine, morpholine or azepane ring which is unsubstituted or substituted by at least one C₁-C₄alkyl or by at least one unsubstituted C₁-C₄alkoy and/or substituted C₁-C₄alkyl, wherein the nitrogen atom may be quaternised; N-mono- or N,N-di-C₁-C₄alkyl-NR₁₄R₁₅ unsubstituted or substituted by hydroxy in the alkyl moiety, wherein R₁₄ and R₁₅ may have any one of the above meanings.

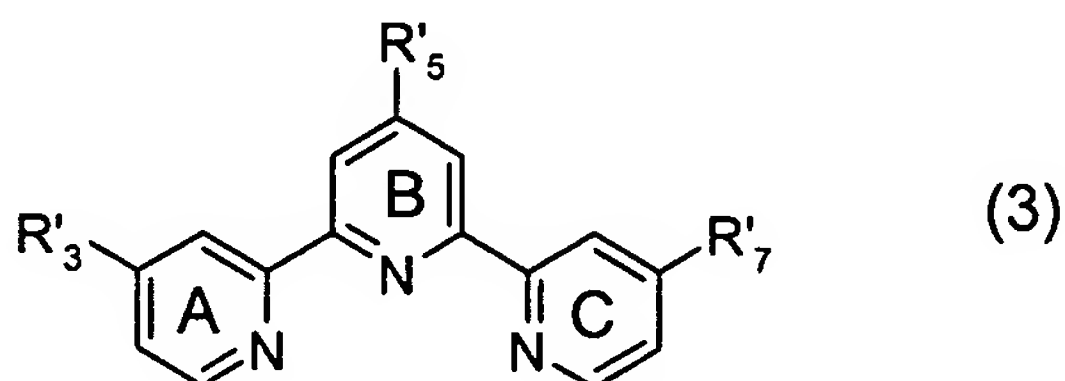
10. (currently amended) A methodUse according to claim 1 to 9, wherein L have the following formula (3)



wherein

R'₃ and R'₇ are independently from each other hydrogen; C₁-C₄alkoxy; hydroxy; N-mono- or N,N-di-C₁-C₄alkylamino unsubstituted or substituted by hydroxy in the alkyl moiety, wherein the nitrogen atoms, especially the nitrogen atoms that are not bonded to one of the rings A, B and/or C, may be quaternised; or a pyrrolidine, piperidine, piperazine, morpholine or azepane ring unsubstituted or substituted by at least one C₁-C₄alkyl, wherein the amino groups may be quaternised, R'₅ is C₁-C₄alkoxy; hydroxy; N-mono- or N,N-di-C₁-C₄alkylamino unsubstituted or substituted by hydroxy in the alkyl moiety, wherein the nitrogen atoms, especially the nitrogen atoms that are not bonded to one of the rings A, B and/or C, may be quaternised; or a pyrrolidine, piperidine, piperazine, morpholine or azepane ring unsubstituted or substituted by at least one C₁-C₄alkyl, wherein the amino groups may be quaternised.

11. (currently amended) A methodUse according to claim 1 to 10, wherein L have the following formula (3)

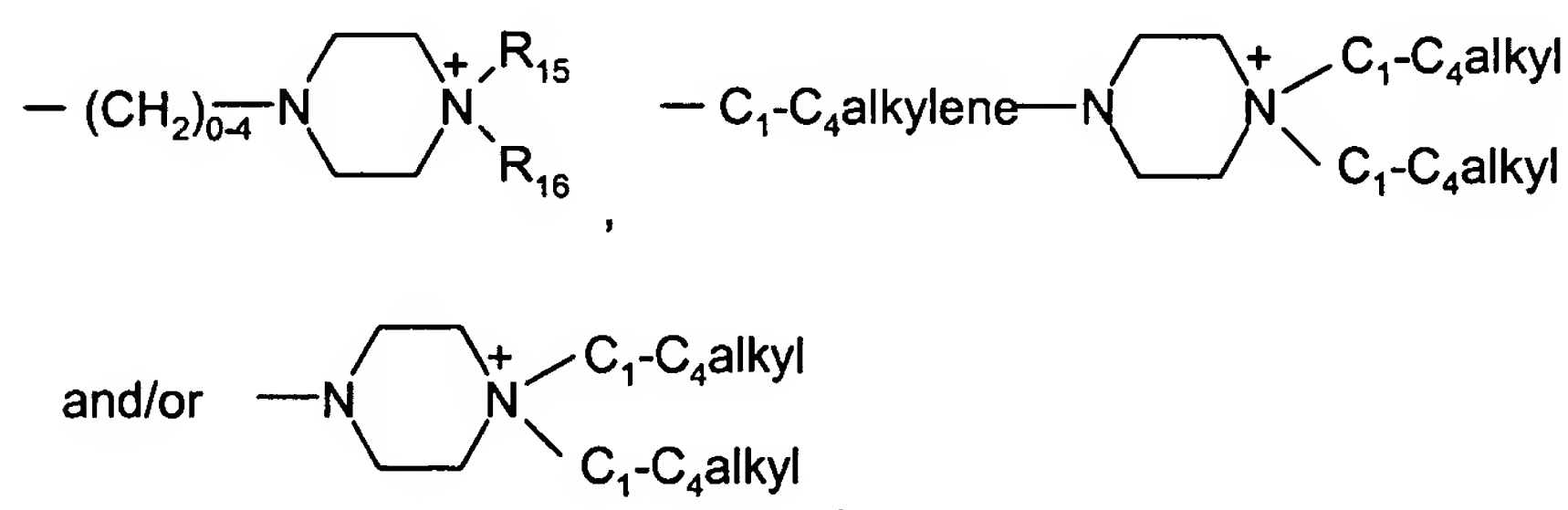


wherein

R'₃ and R'₇ are independently from each other hydrogen; C₁-C₄alkoxy; hydroxy; N-mono- or N,N-di-C₁-C₄alkylamino unsubstituted or substituted by hydroxy in the alkyl moiety, wherein the nitrogen atoms, especially the nitrogen atoms that are not bonded to one of the rings A, B and/or C, may be quaternised; or a pyrrolidine, piperidine, piperazine, morpholine or azepane ring unsubstituted or substituted by at least one C₁-C₄alkyl, wherein the amino groups may be quaternised,

R'₅ is C₁-C₄alkoxy; hydroxy; N-mono- or N,N-di-C₁-C₄alkylamino unsubstituted or substituted by hydroxy in the alkyl moiety, wherein the nitrogen atoms, especially the nitrogen atoms that are not bonded to one of the rings A, B and/or C, may be quaternised; or a pyrrolidine, piperidine, piperazine, morpholine or azepane ring unsubstituted or substituted by at least one C₁-C₄alkyl, wherein the amino groups may be quaternised, with the proviso that

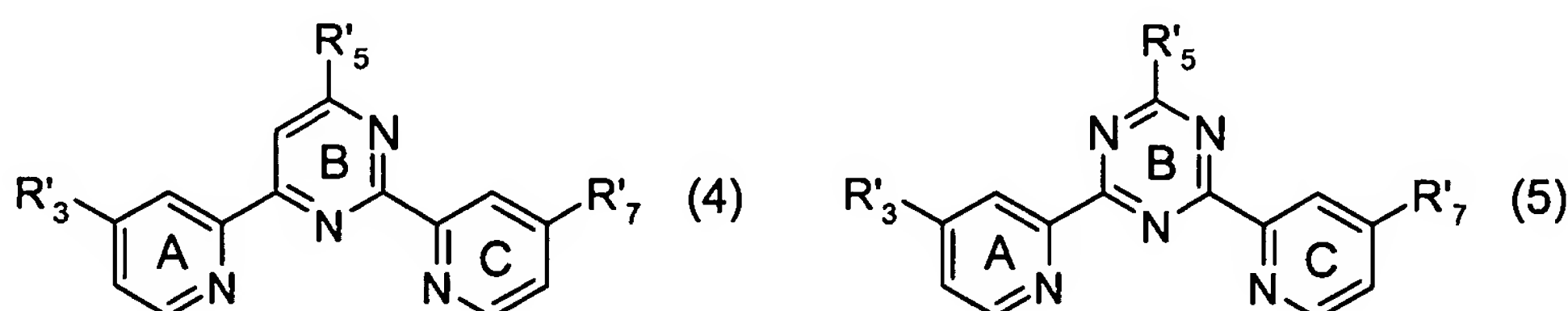
(i) at least one of the substituents R'₃, R'₅ and R'₇ is one of the radicals



wherein R₁₅ and R₁₆ are independently from each other hydrogen or unsubstituted or substituted C₁-C₁₈alkyl or unsubstituted or substituted aryl and

wherein the unbranched or branched alkylene group may be unsubstituted or substituted, and wherein the C₁-C₄alkyl groups, which are branched or unbranched independently of one another, may be unsubstituted or substituted and wherein the piperazine ring may be unsubstituted or substituted.

12. (currently amended) A method Use according to claim 1 to 9, wherein L have the following formula (4) and/or (5)



wherein

R'₅ is C₁-C₄alkoxy; Cl; hydroxy; phenyl; phenyl substituted by OC₁-C₂alkyl, OH or C₁-C₄alkyl; N-mono- or N,N-di-C₁-C₄alkylamino unsubstituted or substituted by hydroxy in the alkyl moiety; or -NR₁₄R₁₅; -(C₁-C₆alkylene)-NR₁₄R₁₅; -N(R₁₃)-(C₁-C₆alkylene)-NR₁₄R₁₅; -N[(C₁-C₆alkylene)-NR₁₄R₁₅]₂; or -N(R₁₃)-N-R₁₄R₁₅, wherein

R₁₃ is hydrogen; C₁-C₁₂alkyl or unsubstituted phenyl or phenyl substituted by (substituted in the alkyl moiety by hydroxy) N-mono- or N,N-di-C₁-C₄alkylamino-, N-phenylamino-, N-naphthylamino-, phenyl-, phenoxy- or naphthyloxy, and

R₁₄ and R₁₅ are each independently of the other hydrogen, unsubstituted or hydroxy-substituted C₁-C₁₂alkyl, unsubstituted phenyl or phenyl substituted as indicated above, or

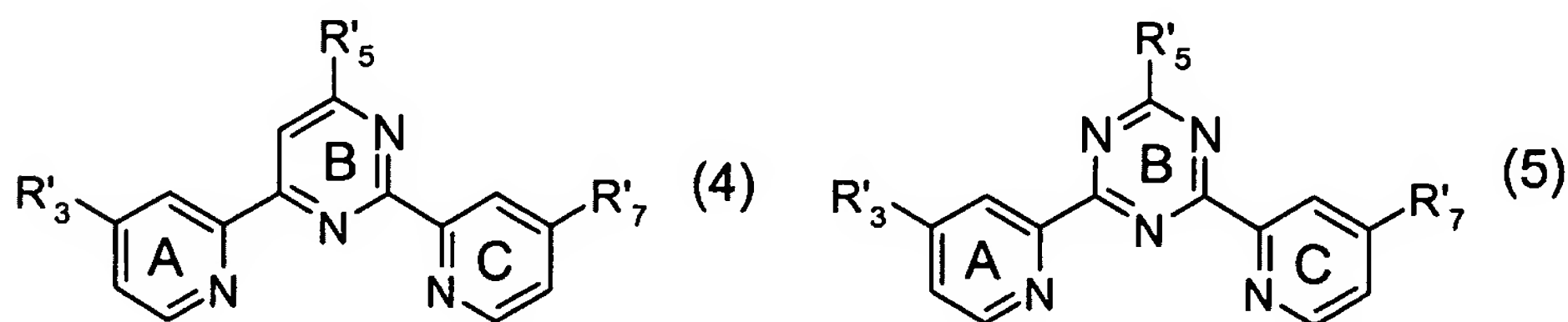
R₁₄ and R₁₅, together with the nitrogen atom linking them, form a pyrrolidine, piperidine, piperazine, morpholine or azepane ring that is unsubstituted or substituted by at least one unsubstituted C₁-C₄alkyl and/or substituted C₁-C₄alkyl, especially a pyrrolidine, piperidine, piperazine, morpholine or azepane ring, and

R'₃ and R'₇ are each independently of the other hydrogen; C₁-C₄alkoxy; Cl; hydroxy; phenyl; phenyl substituted by OC₁-C₂alkyl, OH or C₁-C₄alkyl; N-mono- or N,N-di-C₁-C₄alkylamino substituted by hydroxy in the alkyl moiety; or -NR₁₄R₁₅; -(C₁-C₆alkylene)-NR₁₄R₁₅; -N(R₁₃)-(C₁-C₆alkylene)-NR₁₄R₁₅; -N[(C₁-C₆alkylene)-NR₁₄R₁₅]₂; or -N(R₁₃)-N-R₁₄R₁₅, wherein

R₁₃ is hydrogen; C₁-C₁₂alkyl or unsubstituted phenyl or phenyl substituted by (substituted in the alkyl moiety by hydroxy) N-mono- or N,N-di-C₁-C₄alkylamino-, N-phenylamino-, N-naphthylamino-, phenyl-, phenoxy- or naphthyloxy, and R₁₄ and R₁₅ are each independently of the other hydrogen; unsubstituted or hydroxy-substituted C₁-C₁₂alkyl, unsubstituted phenyl or phenyl substituted as indicated above, or

R₁₄ and R₁₅, together with the nitrogen atom linking them, form a pyrrolidine, piperidine, piperazine, morpholine or azepane ring that is unsubstituted or substituted by at least one unsubstituted C₁-C₄alkyl and/or substituted C₁-C₄alkyl, especially a pyrrolidine, piperidine, piperazine, morpholine or azepane ring.

13. (currently amended) A method Use according to claim ~~124 to 9~~ 9, wherein L have the following formula (4) and/or (5)



organic peroxy acids of formula
$$R_{18}-\overset{\overset{O}{\parallel}}{C}-O-OM$$
,

wherein

M signifies hydrogen or a cation,

R₁₈ signifies unsubstituted C₁-C₁₈alkyl; substituted C₁-C₁₈alkyl; unsubstituted aryl; substituted aryl; - (C₁-C₆alkylene)-aryl, wherein the alkylene and/or the arylalkyl group may be substituted; and phthalimidoC₁-C₈alkylene, wherein the phthalimido and/or the alkylene group may be substituted is used.

16. (currently amended) A method~~Use~~ according to ~~any of the preceding claim~~[[s]] 15, wherein CH₃COOOH or epsilon-phthalimido peroxy hexanoic acid or a alkali salt thereof is used.

17. (currently amended) A method~~Use~~ according to ~~any of the preceding claim~~[[s]] 1, wherein TAED and/or NOBS as precursors of peroxy acids and sodium percarbonate and/or sodium perborate are used.

18. (currently amended) A method~~Use~~ according to ~~any one of claim~~[[s]] 1 to 17 for the bleaching of stains,[[or]] bleaching of soiling on textile material,[[or]] for the prevention of redeposition of migrating dyes, or for the cleaning of hard surfaces.

19. (currently amended) A method~~Use~~ according to ~~any one of claim~~[[s]] 1 to 17, wherein the metal complex compounds of formula (1) are used as catalysts for reactions using peroxo acids or their precursors for bleaching in the context of paper making.

20. (currently amended) A method~~Use~~ according to ~~any one of claim~~[[s]] 1 to 17, wherein the metal complex compounds of formula (1) are used in detergent, cleaning, disinfecting or bleaching compositions.

21. (currently amended) A method~~Use~~ according to ~~any one of claim~~[[s]] 1 to 17, wherein the metal complex compounds of formula (1) are used in automatic dishwasher formulations.

22. (currently amended) A method~~Use~~ according to claim 20, wherein the metal complex compounds of formula (1) are formed *in situ* in the detergent, cleaning, disinfecting or bleaching composition.

23. (currently amended) A detergent, cleaning, disinfecting or bleaching composition containing

- I) from 0 to 50 wt-%, ~~preferably from 0 to 30 wt-%~~, A) of at least one anionic surfactant and/or B) of a non-ionic surfactant,
- II) from 0 to 70 wt-%, ~~preferably from 0 to 50 wt-%~~, C) of at least one builder substance,
- III) 1 - 99 wt-%, ~~preferably 1 - 50 wt-%~~, D) of at least one peroxy acid and/or at least one precursors of peroxy acid, the latter in combination with hydrogen peroxide and/or a precursor of hydrogen peroxide ~~as defined in claims 14, 15, 16 and 17~~,
- IV) E) at least one metal complex compound of formula (1) as defined in claim ~~1~~ **1** in an amount that, in the liquor, gives a concentration of from 0.5 to 100 mg/litre of liquor, ~~preferably from 1 to 50 mg/litre of liquor~~, when from 0.5 to 20 g/litre of the detergent, cleaning, disinfecting or bleaching agent are added to the liquor, and
- V) water ad 100 wt-%,

wherein the percentages are in each case percentages by weight, based on the total weight of the composition.

24. (currently amended) A solid formulation containing

- a) from 1 to 99 wt-%, ~~preferably from 1 to 40 wt-%, especially from 1 to 30 wt-%~~, of at least one metal complex compound of formula (1) as defined in claim ~~1~~ **1** and at least one organic peroxy acid and/or at least one precursor of an organic peroxy acid and H_2O_2 ~~as defined in claims 14, 15, 16 and 17~~,
- b) from 1 to 99 wt-%, ~~preferably from 10 to 99 wt-%, especially from 20 to 80 wt-%~~, of at least one binder,
- c) from 0 to 20 wt-%, ~~especially from 1 to 20 wt-%~~, of at least one encapsulating material,
- d) from 0 to 20 wt-% of at least one further additive and
- e) from 0 to 20 wt-% water.

25. (original) A solid formulation according to claim 24, which is in the form of granules.